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XV.

INJURIOUS INSECTS AND OTHER ANIMALS OBSERVED IN IRELAND DURING THE YEARS 1916, 1917, AND 1918.

By GEORGE H. CARPENTER, D.SC., F.E.S.; Professor of Zoology in the Royal College of Science for Ireland, and Consulting Entomologist to the Royal Dublin Society.

(Plates XIX–XXIV.)

Read June 22. Published November 2, 1920.

CORN INSECTS.

Blackfly Grubs.

Bibio sp.

A number of these larvae were received from Co. Cavan at the end of March, 1918, with the information that they had caused much damage in wheat-fields by eating the roots. On account of their depredations the field was said to have become badly "patched." On examining the food-canal of some of these grubs, I found that the contents were made up of plant tissues—cells of the spongy tissue (parenchyma) and also strands of the vascular bundles being easily recognizable. Further evidence is thus provided that these grubs cause direct injury to cultivated plants; they have already been mentioned in this series of papers (2, pp. 146–7) as harmful to potato tubers, and another record of injury by them to potatoes will be found below (p. 264).

CABBAGE INSECTS.

The Common Cockchafer.

Melolontha vulgaris Fab.

The well-known grubs of this common beetle (see 2, pp. 79–81) were received in June, 1917, from Co. Kerry, where they had been found eating the roots of cabbage plants. The specimens were about half-grown. Damage by cockchafer larvae to cruciferous

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crops has been recorded, but in these countries they are less commonly found in cabbage gardens than in pastures.

The Cabbage Stem-Borer.

Psylliodes chrysocephala (Linn.).

An account of the life-history and habits of this beetle has previously been given (1, pp. 427–430). In May, 1917, larvae, burrowing, according to their usual method, in the stems of cabbages were received from Co. Waterford. In June, 1917, specimens of the beetle were sent from Co. Roscommon, where they had done much damage to early cabbage plots by eating the leaves after the manner of "turnip fly."

The Common Cranefly.

Tipula oleracea Linn.

The record of a somewhat unusual mode of damage by "leather-jacket" grubs was made in Co. Dublin during May, 1917. They attacked cabbage and cauliflower and also lettuce and beet-root, eating through the stem at the ground-level, and devouring the leaves after the fall of the plant. As many as ten grubs were observed around a single cabbage.

BEAN AND PEA INSECTS.

The Green Capsid Bug.

Lygus pabulinus (Linn.).

(Plate XIX a, b, c.)

In early June, 1917, young plants of Beans and Peas in a Co. Dublin garden were found to be suffering from attack by immature capsid bugs, some specimens of which, reared into the adult stage, proved to belong to *Lygus pabulinus*, a species previously noticed (2, pp. 64–6, fig. 8) as injurious to the foliage of rose trees.

The action of these bugs on the plant was demonstrated by placing a number of the immature insects on certain seedlings of

a batch free from any other insect pest. In this work I had the advantage of facilities and help from my friend and colleague, Dr. G. H. Pethybridge, who kindly devoted a portion of his greenhouse to the experiment. Comparison of the infected and "control" plants (illustrated on Plate XIX A, B) showed that the bugs attacked the developing buds in preference to the older leaves, and that the shoots thus became arrested and the leaves deformed and crumpled—a definite reaction of the plant-tissues to the punctures inflicted by the insects' piercing jaws. The deformation of the leaves is well shown in the large-scale photograph (Plate XIX C), and this resembles rather closely the injury to apple foliage by capsid bugs, described and photographed by Fryer (4). Sprays containing nicotine have been shown by Fryer and others to be the most effective applications for destroying capsid bugs. It is noteworthy that these insects are destructive in the immature stages, when their cuticle, thinner and more delicate than that of the adult, is permeable by poisonous spray fluids.

Black Aphid.

Aphis rumicis Linn.

This common pest (see 1, pp. 594–5 ; 2, pp. 10–11) was found to be swarming on beans growing in Dublin allotment plots in July, 1918.

POTATO INSECTS.

Capsid Bugs.

Lygus pabulinus (Linn.) and *Calocoris bipunctatus* (Fab.).

The former of these two bugs has just been mentioned as injurious to young pea plants. It was also noticed in the summer of 1917 on the leaves of potato in a Co. Dublin garden, in company with a second species of the same family (Capsidae) *Calocoris bipunctatus*. Both were present in numbers, and did much damage to the potato foliage. The young shoots, especially of the early varieties, were brown and shrivelled, and as many as six insects might be found sheltering between the withered leaves of a shoot, which had no chance of reaching its normal standard of growth.

An account of *Lygus pabulinus* has already been given in this

series of papers (2, pp. 64–7, above.) Bugs of the genus *Calocoris* differ from *Lygus* in their usually larger size, relatively shorter beak, and in having the basal segment of the hind foot rather longer than the second segment. *C. bipunctatus* is a green insect, with blackish spots on the prothorax, and reddish tint on the forewings of the male, clothed rather thickly with blackish hairs. It attains a length of 7 mm. (about $\frac{3}{10}$ inch), and is an abundant insect in Ireland, feeding indifferently on many kinds of plants.

Calocoris bipunctatus.
Magnified four times.

As in the case of the injury to beans and peas (p. 260, above), so the damage to the potato foliage was mostly caused by these bugs while still in their immature stages. When received (in July, 1917), they had completed their growth, so that their specific identification was easy.

Theobald (9, 1905, pp. 94–7) records the Tarnished Plant-bug (*Lygus pratensis* Fab.) as injurious to potato shoots in the south of England, in the manner now observed in Co. Dublin.

The Brown Froghopper.

Aphrophora alni Fall.

Specimens of this insect in its immature ("cuckoo-spit") stage were received at the end of June from Co. Limerick, and early in

July from King's Co. In both cases they were present in numbers on the tops of potato shoots, whence they sucked sap, so as to cause shrivelling and arrest of growth. The "froghoppers" belong to the family Cercopidae of the Homopterous sub-order of the Hemiptera, distinguished from the Heteroptera (to which the Capsidae belong) by the close approximation of the beak to the forelegs, and by the fore-wings being inclined when at rest, whereas those of the Heteroptera lie flat. The Cercopidae have a relatively broad head and a triangular scutellum, with the hind-legs adapted for jumping. In their early stages they have a comparatively delicate cuticle, and surround themselves with a frothy protective secretion, which makes their presence noticeable on plants when a large number of them are crowded on neighbouring shoots. The "contact poison" washes generally used for destroying other sucking insects may be employed against these.

Frosted Orange and Rosy Rustic Moths.

Gortyna ochracea (Hüb.) and *Hydroecia micacea* (Esp.).

The caterpillars of these moths, boring in potato-stems, are now fairly well known as pests (see 1, pp. 253–4, and 2, p. 224). The former species was observed in Co. Louth, and also in Co. Kerry in July, 1916; the latter in Co. Cork at the end of June, 1916, and again early in July, 1917; at the end of June, 1917, it was also observed in the Belfast district. In the last-named locality the caterpillars were present in numbers, giving rise to a noticeable wilting of the foliage.

Crane-fly Grubs.

Tipula oleracea (Linn.).

The common "leather-jacket" grubs were noticed in Co. Dublin early in June, 1918, eating potato-stalks above the ground-level. This unusual habit followed the extensive cultivation of pasture which was carried on in the spring of 1918, and may perhaps be regarded as a response by the larvae to the disturbance of their normal surroundings.

Black Fly Grubs.

Bibio marci (Linn.).

Damage to potato tubers by the larvae of Bibionidae has been already recorded (2, pp. 146–7). In October, 1916, these grubs attacked potatoes stored in a pit in Co. Louth. They were preserved till the next spring, and completed their transformation, proving to be the common black hairy St. Mark's Fly, which is often seen swarming on blossoms at the end of April.

FLAX PESTS.

Garden and Field Slugs.

Arion hortensis Fér. and *Agriolimax agrestis* (Linn.).

Early in June, 1917, specimens of these two common slugs were sent from Co. Londonderry, where they had been found eating flax seedlings, cutting the plants right across the stem. I am indebted to my colleague, Mr. H. A. Lafferty, A.R.C.Sc.I., for this observation. An account of *Agriolimax agrestis* has already been given (1, pp. 326–8). In the genus *Arion* the breathing-opening is situated towards the front edge of the mantle. *A. hortensis* is 24–36 mm. (1–1½ inches) long, of a grey colour, with a dark (blackish or purple) band along each side, and a yellow or orange foot.

The Flax Flea Beetle.

Longitarsus parvulus (Fab.) = *ater* (Payk.).

This destructive little beetle caused much damage to the flax crop in all three seasons under review. In 1917 and 1918 it was found necessary to re-sow the crop in several localities.

ORCHARD INSECTS.

Capsid Bugs.

Lygus pabulinus (Linn.).

(PLATE XXI E, F.)

This bug has already been mentioned as harmful to the foliage of beans and potatoes (pp. 260–2, above). In June, 1916 and

1917, the immature nymphs of the species were noticed by Mr. J. Hagan in Co. Armagh orchards as seriously harmful both to foliage and to young fruit in the manner described by Fryer (3), whose observations have been previously referred to in connexion with similar damage to apple fruitlets in 1915 caused by shield bugs (2, pp. 227–9). The wrinkling and cracking of the surface of the fruits, due to the punctures of the beaks of these insects, is very characteristic, and has been well brought out in the accompanying photograph (Plate XXI), for which I am indebted to Mr. Hagan's courtesy. The efficiency of a nicotine spray in controlling these insects is well demonstrated by comparing the aspect of the injured apples (Plate XXI E) with that of fruit from trees which were sprayed with nicotine wash (Plate XXI F). Mr. Hagan has published (5) an account of these spraying experiments. For three successive seasons at Loughgall twenty-five trees have been sprayed with an extract of tobacco waste, and twenty-five with a proprietary wash, while one tree was left unsprayed. "Both spray fluids proved very effective in dealing with capsid bugs. Ninety-five per cent. of the fruit was perfectly clean and showed no trace of injury, whereas all the fruit on the unsprayed tree showed injury caused by capsids; in fact, the great majority were worthless for any other purpose than boiling."

The advantage of nicotine and soap-wash for destroying capsid bugs on apple-trees has been also demonstrated in England by means of comparative spraying experiments described in the recent papers of Fryer and Petherbridge (4, 8).

The Beech-Leaf Weevil.

Orchestes fagi (Linn.).

(PLATE XXII G, H.)

At midsummer, 1918, young apple fruitlets were received from Co. Galway with the surface eaten into holes and grooves by small jumping beetles which, on examination, proved to be the common weevil of the beech, *Orchestes fagi*; the brown blisters on the beech-leaves in which the larvae of these weevils feed are well known to all observant persons. This injury to apple fruitlets by the beetles was noticed at Mount Bellew by

Mr. J. Moran, who forwarded the specimens to Sir Frederick Moore. Such a change of feeding-habit is very remarkable, but Mr. Moran informed us that the affected apple-trees are overhung by tall beech-trees, from which the weevils had fallen or leapt on to the undergrowth. A similar observation, made in South Devon in 1912, is recorded by Theobald (9, pp. 11–13).

The genus Orchestes is distinguished by the very small and narrow head and thorax, and the strong, stout hind thighs, which enable these weevils to jump like "turnip fly"; they have well-developed wings, and are good flyers. There are several species, which live on various trees. *O. fagi* (Pl. XXII G) is 3 mm. ($\frac{1}{8}$ inch) long, dull black, with grey pubescence, and the punctures on the elytra rather coarse; the legs and feelers are bright brown. After passing the winter under bark or among dead leaves, the beetles come out of their shelters in early spring; they feed on beech-trees, eating the leaves into holes, and the females insert their eggs into cuts in the midribs of the leaves. The legless grubs eat into the soft green tissue, making a straight tunnel to the apical margin of the leaf, and then extending their ravages so as to produce a broad brown patch, covering possibly half the area of the leaf. The larvae become fully fed in about three weeks, pupate within the leaf blister, and complete their transformation into beetles a fortnight later. It was this June generation of weevils, emerging quickly in large numbers, that passed from the beeches to the apple-trees, and injured the fruits in the manner already described. The appearance of the eaten fruitlets is shown in the accompanying photograph (Plate XXII H), from which it may be seen that the beetles excavate deep round pits, or make fairly straight furrows around the surface of the young apples. The photograph, which illustrates Theobald's paper (9, 1912, fig. 1), shows a similar type of injury.

The Raspberry Shoot-Moth.

Lampronia rubiella Bjerk.

The stem-boring caterpillars of this moth were noticed in April, 1918, injuring loganberries in a Dublin garden. The

insect has been previously described and figured (1, pp. 600–1). It is a well-known pest of raspberry, and that it should attack loganberry is not surprising.

Bell-Moth.

Aspis uddmanniana (Linn.).

In June, 1917, shoots of loganberry were received from a Dublin garden, the leaves rolled and spun together by caterpillars of some bell-moth (Tortricid). By rearing the insects to the winged state, the species was identified as *Aspis uddmanniana*, whose larvae are known to feed on both the parents of loganberry: raspberry, and bramble. This moth is 15–20 mm. ($\frac{3}{5}$ to $\frac{4}{5}$ inch) across the outspread forewings, which are whitish-brown, with dark streaks, and a central band indistinct on the costa, but forming a conspicuous reddish-brown spot on the inner margin of the wing. The apex of the wing has also a reddish-brown spot, and the hind wings are grey. The caterpillar is reddish-brown, with black head and prothoracic shield, feeding through May in the rolled-up leaves of its home-plant, pupating on the shoots in a thin cocoon, and becoming transformed in June or July into the moths which pair and lay their eggs on the shoots. This insect is not common in Ireland, and is unlikely to become a pest.

The Pear Midge.

Contarinia pyrivora (Riley).

Young pears spoiled by the larvae of this midge were received from a Co. Dublin garden in June, 1917. The insect, previously described and figured (1, pp. 299–301), is apparently not abundant in Ireland, but it might readily become a serious orchard-pest in any locality, and it is therefore worthy of record.

The Raspberry Leaf-Miner.

Fenusa pumilio Hartig.

Raspberry leaves mined by the caterpillars of this saw-fly were received from Co. Dublin in July, 1916. The insect has already been described and figured (2, pp. 72–3).

GARDEN INSECTS.

Springtails.

Lipura fimetaria (Linn.), *L. armata* Tulb., and *Orchesella villosa* Geoff.

(Plate XX d.)

In an early paper of this series (1, pp. 251–3) and subsequently (*Ib.*, pp. 293-4, 340, 442, 574–6; 2, pp. 48, 61–3, 64, 154) reference has been made to damage done to plants by species of springtails or Collembola. Of these, *Lipura ambulans* (Linn.) has been one of the most prominent (see 1, p. 252, fig. 3). In February, 1917, specimens of another species of Lipura—*L. armata*—a minute white insect resembling *L. ambulans* in its tail-spines, but with more numerous prominences in its post-antennal organ, were received from west Co. Cork, where they had eaten celery, cabbages, and potatoes, and had proved "very destructive all over the garden." In June, 1917, another white springtail—*Lipura fimetaria*—was received from Belfast; the specimens had been found nibbling the roots of cineraria. *L. fimetaria* differs from the other two species in being destitute of tail-spines. It is often exceedingly common in garden soil. In December, 1918, a number of *Orchesella villosa*, a member of the family Entomobryidae, with well-developed spring, the genus distinguished by the six-segmented feelers, and the species by the handsome black and yellow mottling and the long bristly clothing, were sent from Co. Limerick. They also had proved most destructive to a great variety of garden plants. Another species of Orchesella—*O. cincta* (Linn.)—has been recorded by Theobald (9, 1910, pp. 112, 120) as destructive to orchids.

No better treatment than dressings of lime and soot can as yet be recommended for the destruction of these soil-living Collembola.

The Turnip Moth.

Agrotis segetum (Schiff).

In August, 1917, the "surface caterpillars" of this moth were observed in Co. Fermanagh, eating, at the ground-level, plants of a half-rood of henbane, grown for sale. The leaves—the valuable

part of the crop—were found to turn yellow, and to wilt in bright sunshine.

The Magpie Moth.

Abraxas grossulariata (Linn.).

The caterpillar of this common moth is well known on account of its habit of feeding on currant and gooseberry bushes. An unusual habit for it was noticed (by Mr. H. E. Sides) in May, 1918, at Londonderry. He found a specimen of the caterpillar inside a beehive, having apparently joined the miscellaneous group of unbidden insect guests that gain advantage by invading the society of the Honey Bee.

FOREST INSECTS.

Spruce and Pine Aphids.

Aphis abietina (Walk.) and *Lachnus pini* (Linn.).

These two species of aphid were abundant on Spruce and Pine at the end of May, 1918, in Co. Dublin and Co. Cavan. The wingless virgin females of *A. abietina*, which are numerous at that season, are bright-green, with red eyes; the winged forms are of the same colour, but somewhat smaller. The Pine Lachnus is very similar to the Willow-feeding species described in a former paper (2, pp. 156–7), crowding on the bark, and sucking sap from the shoots.

The December Moth.

Poecilocampa populi (Linn.).

Caterpillars of this moth were sent in late June, 1918, from Belfast, where they were feeding on leaves of Silver Fir. In the year 1905 this species was described (1, p. 332) as an unusual enemy of apple foliage, the caterpillars feeding habitually on a great variety of deciduous woodland trees; but it is far more remarkable to find such an insect damaging conifers.

The Giant Pine Sawfly.

Sirex gigas (Linn.).

A number of specimens of this conspicuous insect were received from various parts of the country during 1916. Females were noticed laying eggs in young Pine and Larch trees in Co. Cork. As a rule breeding is carried on in decaying trunks or dead stumps.

OSIER INSECTS.

The Osier-twig Gall Midge.

Rhabdophaga saliciperda (Dufour).

(PLATE XXIII J, K, L.)

At midsummer, 1918, shoots of osier injured by this insect were received from Co. Limerick. I am indebted to Mr. J. E. Collin, F.E.S., for the identification. It was noticed that the insects attacked especially the useful variety of osier known as "Black Mall." Accounts of the life-history and habits of this gall midge have been given by Kieffer (6, pp. 399–400) and MacDougall (7).

Like most of the Cecidomyidae or gall-midges, the fly is minute, 2–3 mm. ($\frac{1}{12}$–$\frac{1}{8}$ inch) in length; dark-brown or black in colour, with black hairs and whitish wings. The eggs are laid on the bark in June and July, the larvae eating their way into the wood, where their presence stimulates the growing tissue to produce irregular swellings, in which the larvae find shelter and food through the autumn and winter, each grub occupying a little oval chamber (Pl. XXIII K). They pupate beneath the bark in the succeeding spring, the winged midges emerging in May or June. The larva and pupa are yellow in colour. The pupae come partially out of the shoots through small round holes in the bark, from which the delicate white pupal cuticles may be seen projecting after the emergence of the midges (Pl. XXIII L). Osier and willow shoots are usually found damaged by this insect when two years old and upwards, and sometimes as much as three inches in diameter. Often newly planted "sets" are attacked close to the ground. It is advisable to cut off and burn galled shoots during the winter, and to tar the exposed surface of affected trunks and stems so as to prevent the emergence of the flies. This must be done in February or March. The bark often ruptures and hangs down in shreds (Pl. XXIII J) on account of the abnormal growth of the underlying woody tissue. The varied appearances presented by the injured shoots are shown in the accompanying photograph (Pl. XXIII, J, K, L). See also Kieffer (6, Pl. XXXIV).

STOREHOUSE INSECTS.

Storehouse Beetles.

Ptinus fur (Linn.) and *Pt. tectus* Boield.

(PLATE XXIV M, N, O, P.)

The former of these is a fairly common beetle in most parts of the country, feeding in old timber as well as in stored food-stuff. The latter, believed to have been introduced from Tasmania, was recorded from Co. Dublin (1, p. 587) in 1908 in a consignment of almonds, and from Co. Wicklow in 1911 (2, pp. 49–50) devouring stuffed birds. Early in 1918 both species were received from Dublin localities, *Ptinus fur* (Pl. XXIV O) in numbers, among seeds of henbane, in a sample intended for sowing; and *Pt. tectus* (Pl. XXIV M) in a chemist's store of casein. It was interesting to notice how the food-material was in both instances used by the larvae, the small rough seeds (Pl. XXIV P) or the fragments of casein (Pl. XXIV N) being spun together so as to form a hollow sub-spherical chamber for pupation. *Pt. tectus* was also discovered in a Dublin house, eating holes in carpets, whence it appears that it can feed acceptably on a great variety of substances.

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EXPLANATION OF PLATES.

Plate XIX.

A. Pea Plant damaged by Capsid Bugs.
B. Pea Plant shielded from Bugs.
C. Foliage of Bean, showing deformation of leaves by Capsid Bugs (enlarged).

Plate XX.

D. Potato tuber infested with White Springtails (*Lipura armata*).

Plate XXI.

E. Apples injured by Capsid Bugs.
F. Apples from tree sprayed with nicotine for destruction of Bugs.

Plate XXII.

G. Beech Weevil (*Orchestes fagi*). Magnified.
H. Young Apples eaten by Beech Weevil.

Plate XXIII.

J. Osier shoot injured by Gall-Midge (*Rhabdophaga saliciperda*). The back is peeling off, and exit holes are numerous.
K. Osier twig with the bark and outer wood removed to show larval chambers of *R. saliciperda*.
L. Osier shoot with exit holes in bark, through some of which empty pupal cuticles of *R. saliciperda* are projecting.

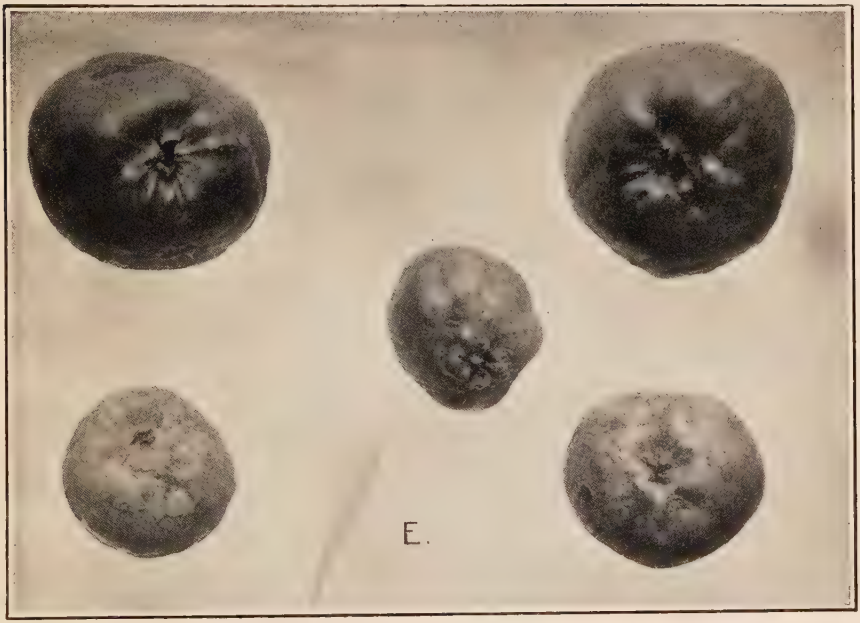
Plate XXIV.

M. *Pt. tectus*, male and female. Magnified.
N. Larval chamber of *Pt. tectus* made of fragments of casein.
O. *Ptinus fur*, male and female. Magnified.
P. Larval chamber of *Pt. fur* made of henbane seeds.

A
B.

C.

D.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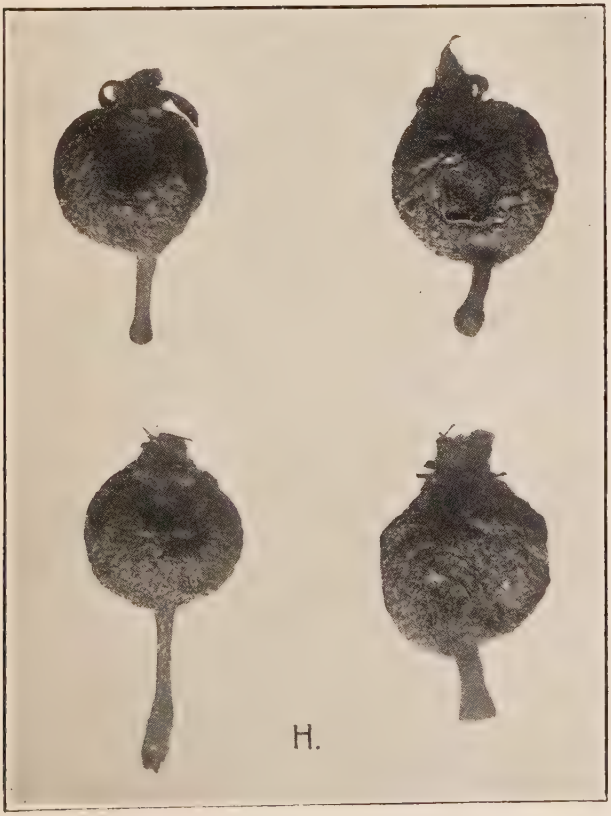

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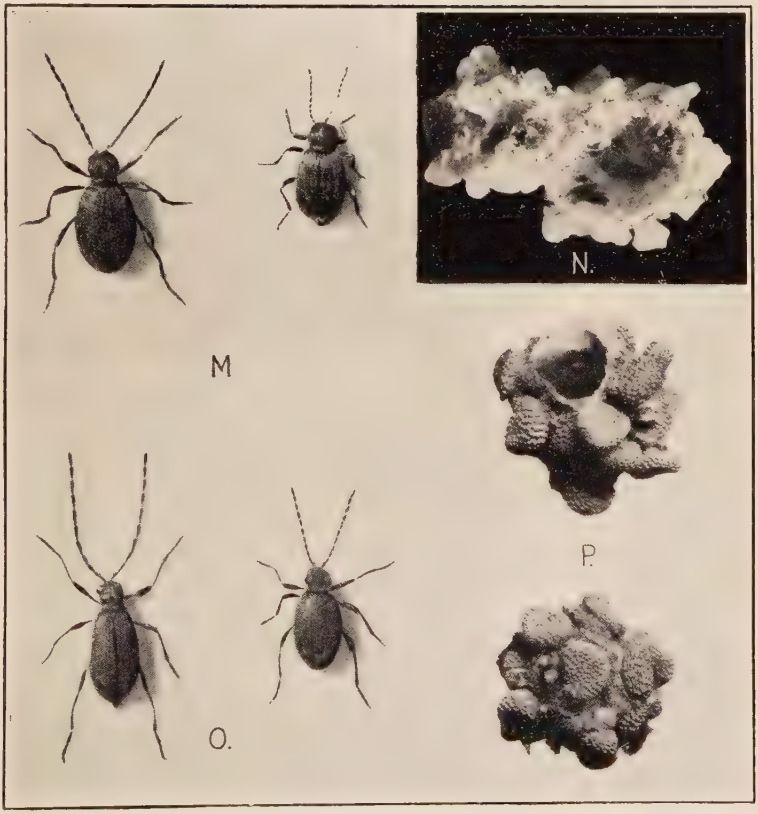
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